



DEFENSE LOGISTICS AGENCY

AMERICA'S COMBAT LOGISTICS SUPPORT AGENCY



Reestablishing Strategic and Critical Material Security in the Department of Defense

May 11, 2011

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Why the Interest in Strategic and Critical Materials?



Metal Prices Recently Skyrocketed



Electronics

Copper	> 500%
Tungsten	300%
Germanium	300%
Indium	300%

Structure

Aluminum	250%
Titanium	600%
Chromium	500%
Manganese	350%

Engine

Nickel	> 700%
Cobalt	325%
Molybdenum	500%
Rhenium	> 1000%

Peak price increases since January 2003



Major Raw Material Supply Disruptions Have Occurred in the Recent Past

1966 through 1971

Embargo of chromium imports from Rhodesia

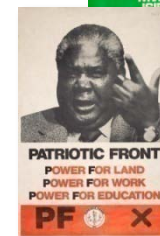
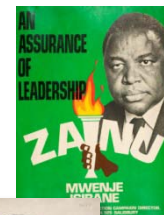


1969

Nickel workers strike in Canada

1978

Panic buying of cobalt due to political instability
in Zaire and Zambia



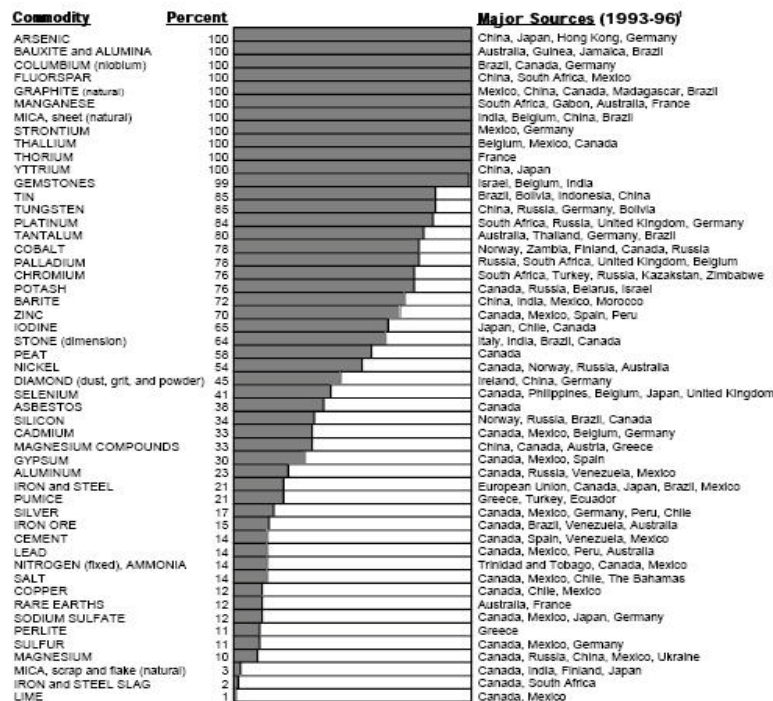
Present

Unrest in the Congo causing concern with respect to metal supplies such as tin, tungsten and tantalum



US Reliance on Imports is Expanding at an Accelerated Rate

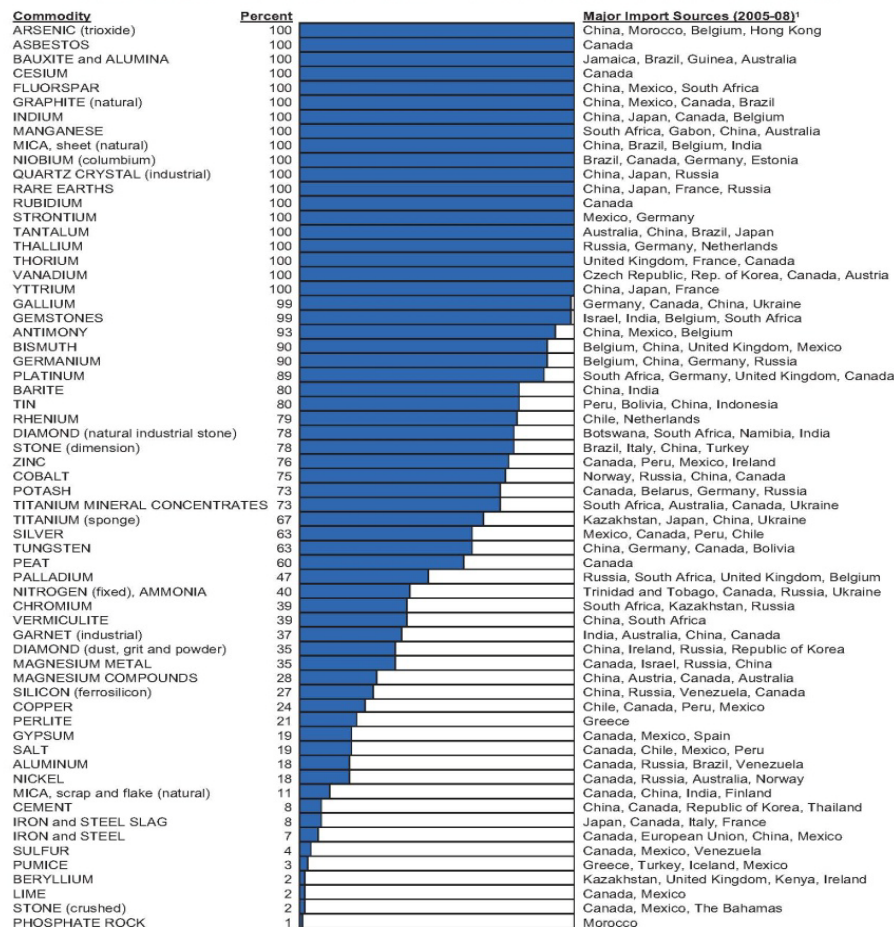
1997 U.S. NET IMPORT RELIANCE FOR SELECTED NONFUEL MINERAL MATERIALS



Additional commodities for which there is some import dependency but data are withheld or are insufficient to determine import-reliance levels:

Antimony	China, Mexico, Bolivia, South Africa	Mercury	Russia, Canada, Spain, Kyrgyzstan
Bismuth	Mexico, Belgium, China, United Kingdom, Canada	Rhenium	Chile, Germany, Netherlands, United Kingdom, Russia
Gallium	France, Russia, Canada, Germany, Hungary	Rutile	Australia, South Africa, Sierra Leone
Germanium	Russia, United Kingdom, China, Belgium, Ukraine	Titanium (sponge)	Russia, Japan, China, Kazakhstan
Ironite	South Africa, Australia, Canada	Vanadium (ferrovanadium)	Russia, Canada, Belgium, Austria
Indium	Canada, Russia, France, Italy, China	Vermiculite	South Africa, China
Kyanite	South Africa	Zirconium	Australia, South Africa

2009 U.S. NET IMPORT RELIANCE FOR SELECTED NONFUEL MINERAL MATERIALS

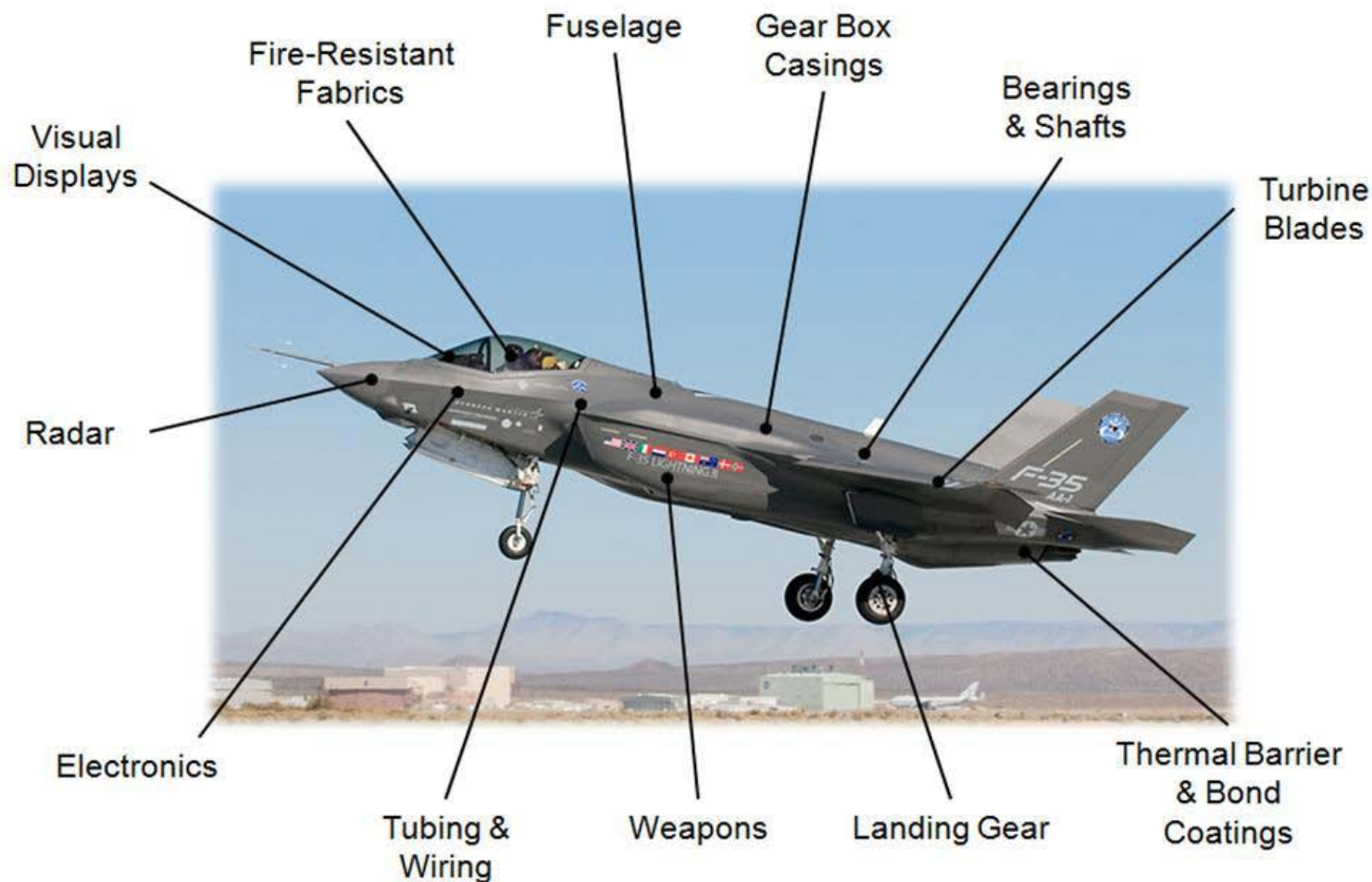


¹In descending order of import share.

from USGS Mineral Commodity Summaries



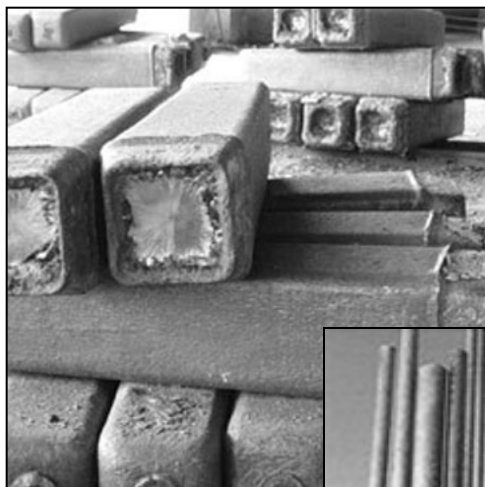
Top Ten Shortage Materials Are Essential for the Production and Performance of Most Systems



The list includes materials other than rare earths and titanium!



What is the Vision for the New Stockpile?





Review of Current Stockpile

- National Defense Stockpile (NDS) History
 - NDS Program established in 1939
 - Purpose: to preclude dependence on foreign sources of supply in time of national emergency
- Reviews of U.S. stockpiling strategies began in 2006
 - A working group was convened in Jan. 2008 by Deputy Undersecretary of Defense for Industrial Policy.
 - Working group included representation from each of the military services, DoD Joint Staff, Department of Commerce, U.S. Geological Survey, and Defense Contract Management Agency.
 - **Conclusion: Stockpile Should Be Reconfigured!**



Reconfiguration Under Way

- Reconfiguration Report submitted to Congress, April 2009
- Initiatives being implemented and/or considered are:
 - Reconfigure the NDS into the Strategic Materials Security Program
 - Grant the SMSP broad programmatic flexibility
 - Modify the current policy to dispose of materials in the NDS
 - Enhance the acquisition authority to employ risk mitigation strategies
 - Consider the need to augment the Transaction Fund with an annual appropriation
- House Armed Services Committee hearing held in July 2009.
- Implementation plan was submitted and accepted in 2010.
- A legislative package has been prepared and is in review.



SMSP Process

- Constantly surveil global markets
 - Assess ever-changing material availability
- Evaluate Material Requirements
 - Military Conflict Scenarios
 - Peacetime Scenarios
- Dynamic List of Material Needs
 - Military weapons platforms
 - Input from Military Services
 - Reviewed by Military Services
- Country Reliability
 - Conflict Scenario
 - Willingness to sell to U.S.
 - Peacetime Scenario
 - Willingness to sell to U.S.
 - Ability to sell to U.S.
- Mitigate Supply Risk
 - Strategic Sourcing
 - Stockpiling
 - Partnering with other countries



“Top Ten” Shortfall Materials

Strategic Material	Important Defense Uses
Aluminum Oxide	Abrasives
Antimony	Flame retardants; batteries
Bauxite, Refractory Grade	High temperature applications
Fluorspar, Acid Grade	Hydrofluoric acid
Manganese Metal	Wireless communications equipment
Neodymium	Magnets, lasers
Tantalum	Capacitors; super alloys
Tin	Solder, alloys
Tungsten	Cutting tools; super alloys
Yttrium	Displays and lighting



What is DLA Strategic Materials doing?

- Moving from traditional stockpiling to acquisition support and commodity/specialty metal expertise
- Performing commodity/specialty metal risk assessments and developing risk mitigation strategies
- Assessing global marketplace and analyzing geopolitical issues for impact on availability of materials
- Continuing to collect data and market intelligence
 - On individual elements
 - On downstream manufacturing into metals, alloys, and semi-fabricated products
- Establishing relationships with key military material experts
- Consolidating DoD material requirements



Titanium Smart Buy

- **DLA contracted to procure titanium:**
 - Navy Requirement: 53,490 lbs in 2009
 - Army Requirement: 148,200 lbs in 2009
 - Total awarded \$3.95M
 - Combined procurement for Army/Navy resulted in approximately \$1.3M cost avoidance
 - Solicitation included provisions for Army to receive a “credit” for the offal material provided as feedstock and “right to recover” opportunity
- **Collaborating with the Military Services to expand the procurement to a much larger scale**





New Mission Example

- U.S. Army Armament Research, Development and Engineering (ARDEC) Initiatives
 - ARDEC's titanium requirements to be supported by DLA Strategic Materials contract
 - The titanium used for gunner protection kits and seats for humvees
 - Contract will be base year and two option years
 - Annual demand estimated at 250,000 lbs
 - Offal to be used as credit to reduce unit price
 - DLA will continue working with ARDEC on similar initiatives



New Mission Example

- Currently working with Tinker Air Force Base on a rhenium availability issue
 - Rhenium is a super alloy used in high efficiency jet engines
- An extensive recycling effort undertaken by Tinker AFB to successfully address Air Force supply shortfalls
- DLA is exploring options for accepting oversight of the recycling project
- Plan is to broaden recycling program participation to include Army and Navy engine super alloys



New Mission Example

- Exploring U.S. Air Force and National Reconnaissance Office (NRO) germanium issue
 - Germanium is a chemical element used in infrared, LED technologies and solar cells
 - Supply Chain issues affect price, quality and availability
 - Inadequate domestic smelting sources
 - Poor quality of materials provided from foreign sources
 - Unreliable pricing
 - High rate of rejection in finished materials
 - USAF/NRO approached DLA Strategic Materials for help addressing germanium wafer sourcing Issues



Addressing Rare Earths Elements

- Rare earths are a family of 17 elements

Element #	Name	Element #	Name
21	Scandium	64	Gadolinium
39	Yttrium	65	Terbium
57	Lanthanum	66	Dysprosium
58	Cerium	67	Holmium
59	Praseodymium	68	Erbium
60	Neodymium	69	Thulium
61	Promethium	70	Ytterbium
62	Samarium	71	Lutetium
63	Europium		

- Used in numerous defense applications such as missile defense, laser weapons and electronic warfare
- Susceptible to supply disruption; not easily substituted
- 7 of the 17 elements are identified as shortfall materials in our FY11 Requirements Report
- Congressional interest – DLA Strategic Materials currently leading the effort on a rare earths report to Congress per FY2011 NDAA Sec 843



New Mission Examples

- Acquire ferro-dysprosium as a vendor-managed rolling inventory.
 - Metal alloy used to manufacture the popular neodymium-iron-boron magnets
 - Magnets needed for military components and hybrid technologies
- Acquire yttrium oxide for physical stockpiling
 - Oxide is the most flexible form of this material
 - Needed for thermal barrier coatings for aircraft components
 - No U.S. production; 100% import dependent
 - Hold until DLA can identify a yttrium metal manufacturer
- Acquire phosphors as a vendor-managed rolling inventory
 - Phosphors contain terbium and europium metals/powders
 - Critically needed for aircraft heads-up displays (HUD)
 - Shortfalls of both materials identified in FY11 National Defense Stockpile Requirements Report



What's Next?

- Legislative changes to Stockpiling Act
 - Significantly shorten material response timeframes
- Engage in material acquisitions to assure industrial base capability
 - Titanium
 - Rare Earth Elements
 - Germanium
 - Rhenium / nickel super-alloys
 - Other materials as supply chain issues are identified
- Re-acquire and expand material expertise



QUESTIONS?

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